

FOS AND GOS AS FUNCTIONAL SWEETENERS: A REVIEW OF THE CURRENT PRODUCTION METHODS

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OBJECTIVES

- To carry out a bibliographic research in order to go into detail about the industrial obtaining methods and their problems.
- Based on this research, to define the current uses of these compounds at nutritional level and in industry.
- To conduct an analysis of the situation and collect information about the suggestions for improvement that are currently being explored.
- To draw objective conclusions related to the previously discussed topic.

2 FUNCTIONALITY OF FOS AND GOS

- Prebiotics because of their structural similarities to the soluble dietary fibre.
 - ◊ Short chain fatty acids (SCFA) production.
 - ◊ Better mineral absorption.
 - ◊ Gastrointestinal immunoregulation.
 - ◊ Suitable for diabetics.

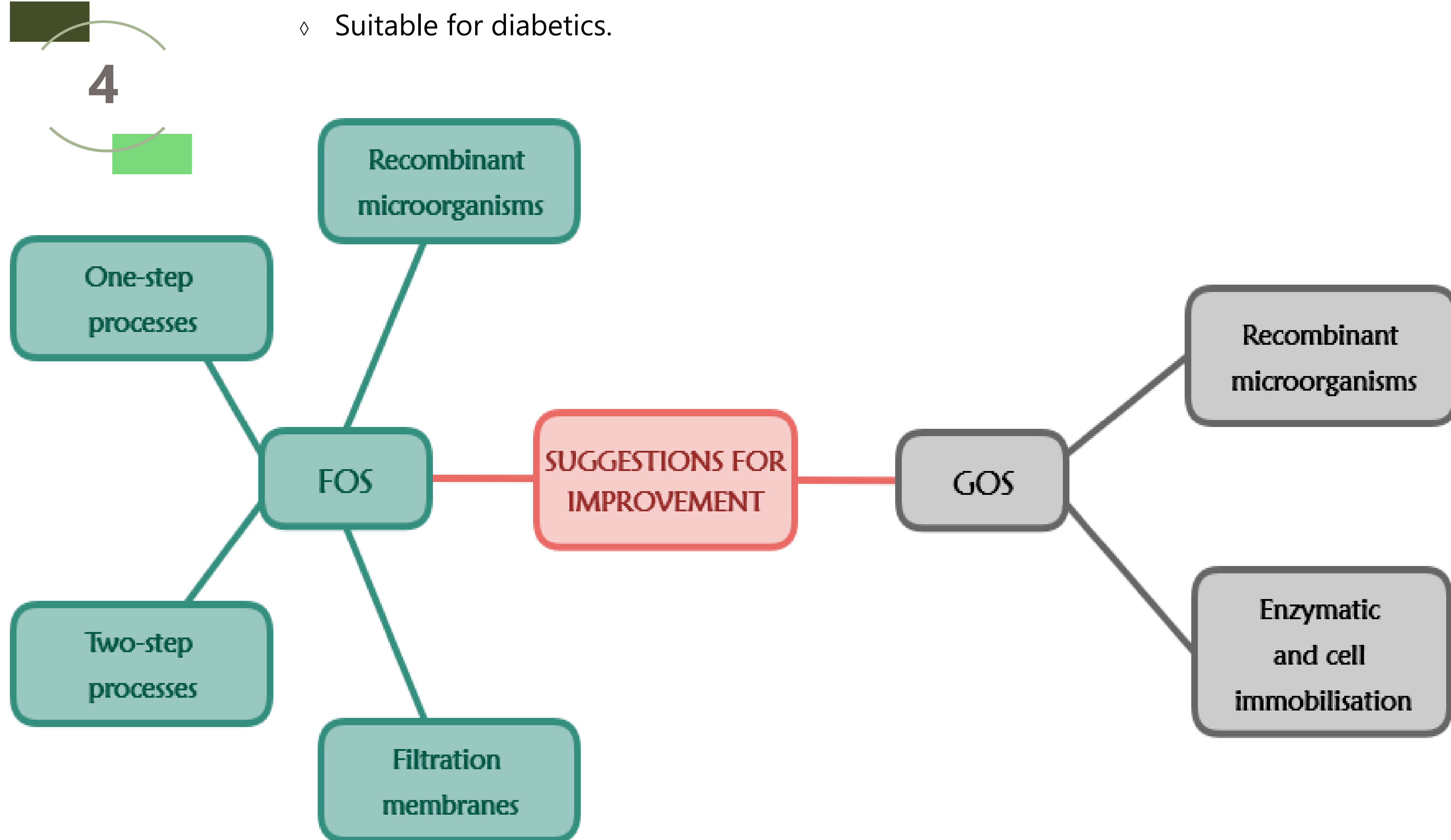


Fig. 2. Different suggested methods to improve FOS and GOS industrial production yields. Outline made with information from (Flores-Maltos *et al.*, 2016), (Goulas *et al.*, 2009), (Han *et al.*, 2017), (Jørgensen *et al.*, 2001), (Kralj *et al.*, 2018), (Misson *et al.*, 2016), (Mussatto *et al.*, 2013), (Nishizawa *et al.*, 2001), (Nobre *et al.*, 2018), (Xie *et al.*, 2017), (Yu and O'Sullivan, 2018).

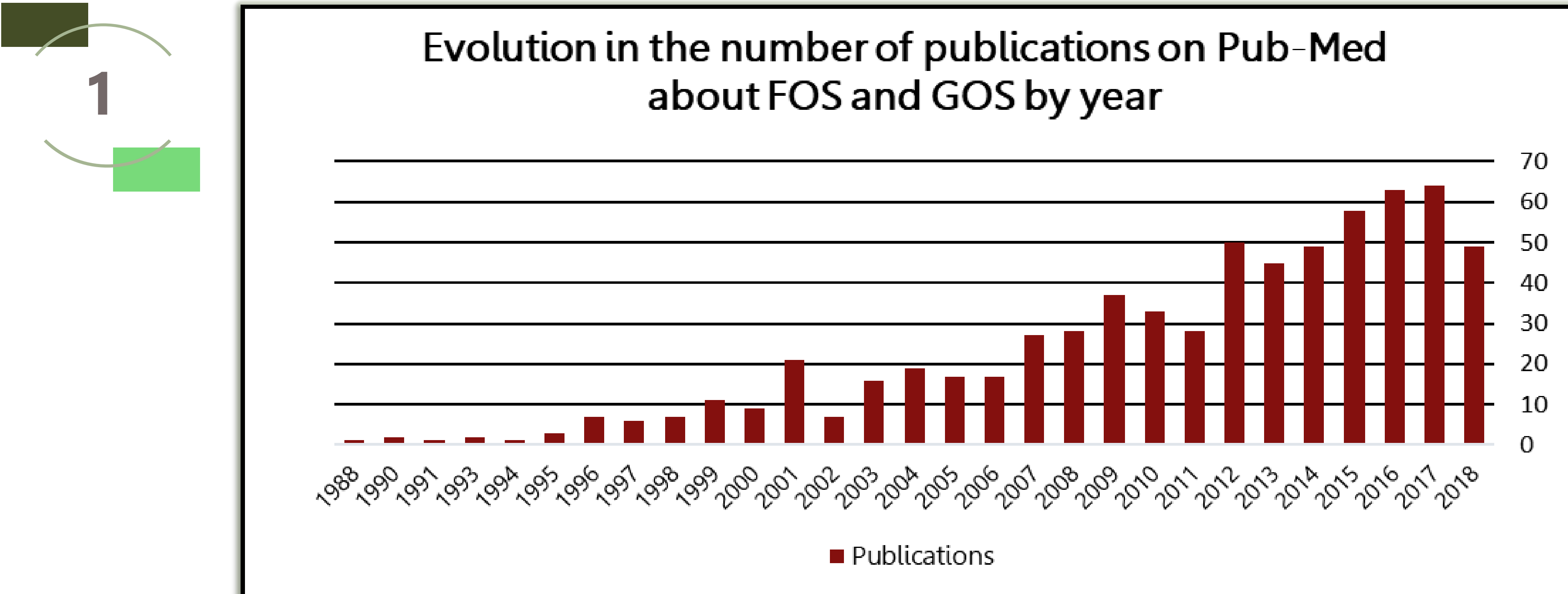


Fig. 1. Evolutionary graphic of the number of publications on Pub-Med database about FOS and GOS. The publications represent the result of searching "(fructooligosaccharides) OR (galactooligosaccharides) AND (yield OR food OR sweetener)".

CURRENT OBTAINING METHODS	
OF FRUCTOOLIGOSACCHARIDES	OF GALACTOOLIGOSACCHARIDES
Hydrolysis using fructosyltransferase	Transgalactosilation using β -galactosidase
Hydrolysis using β -fructofuranosidase	
Hydrolysis using endo and exoinulinases	

Table 1. Current obtaining techniques used at industrial level to produce FOS and GOS. Table made with information from (Flores-Maltos *et al.*, 2016), (Ganaie *et al.*, 2014), (Gosling *et al.*, 2010), (Kralj *et al.*, 2018) and (Macfarlane *et al.*, 2008).

CONCLUSIONS

- Continuous growth of the prebiotic market.
- Recombinant microorganisms, such as bacteria and yeasts, together with the Solid State Fermentation represent a reasonable solution in order to improve FOS and GOS industrial manufacturing yield.
- Optimisation of the productive process requirements using whole cells or their immobilised enzymes could also be part of the solution, as well as ultrafiltration membranes, which improve glucose removal from the medium.
- A need to meet the consumer's demand of this type of products aims further research on the field, especially on GMOs and microorganisms specialized in producing higher quantities of FOS or GOS.